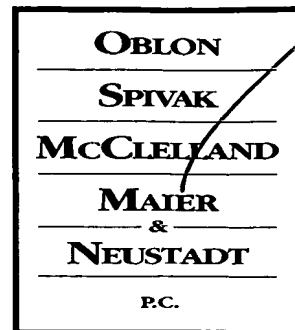




Docket No.: 282726US8X



COMMISSIONER FOR PATENTS  
ALEXANDRIA, VIRGINIA 22313

ATTORNEYS AT LAW

RICHARD L. TREANOR  
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RE: Application Serial No.: 10/631,351

Applicants: Oliver HARNACK, et al.

Filing Date: July 31, 2003

For: METHOD OF ATTACHING HYDROPHILIC  
SPECIES TO HYDROPHILIC MACROMOLECULES  
AND IMMOBILIZING THE HYDROPHILIC  
MACROMOLECULES ON A HYDROPHOBIC  
SURFACE

Group Art Unit: 1641

Examiner: Y.J. MELANIE

SIR:

Attached hereto for filing are the following papers:

**Appeal Brief w/Attachment**

Our credit card payment form in the amount of **\$500.00** is attached covering any required fees. In the event any variance exists between the amount enclosed and the Patent Office charges for filing the above-noted documents, including any fees required under 37 C.F.R. 1.136 for any necessary Extension of Time to make the filing of the attached documents timely, please charge or credit the difference to our Deposit Account No. 15-0030. Further, if these papers are not considered timely filed, then a petition is hereby made under 37 C.F.R. 1.136 for the necessary extension of time. A duplicate copy of this sheet is enclosed.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,  
MAIER & NEUSTADT, P.C.

Richard L. Treanor  
Registration No. 36,379

Customer Number

**22850**

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DOCKET NO: 282726US8X



IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF :  
OLIVER HARNACK, ET AL. : EXAMINER: YU, MELANIE J.  
SERIAL NO: 10/631,351 :  
FILED: JULY 31, 2003 : GROUP ART UNIT: 1641  
FOR: METHOD OF ATTACHING :  
HYDROPHILIC SPECIES TO  
HYDROPHILIC MACROMOLECULES  
AND IMMOBILIZING THE  
HYDROPHILIC MACROMOLECULES  
ON A HYDROPHOBIC SURFACE

APPEAL BRIEF

COMMISSIONER FOR PATENTS  
ALEXANDRIA, VIRGINIA 22313

SIR:

This is an appeal from the Final Rejection dated January 4, 2006.

I. REAL PARTY IN INTEREST

The real party in interest in this appeal is Sony Deutschland GMBH, Koeln, Germany.

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## II. RELATED APPEALS AND INTERFERENCES

Appellants, Appellants' legal representative and the assignee are aware of no appeals, interferences, or judicial proceedings which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

## III. STATUS OF THE CLAIMS

Claims 2-20 are pending and are rejected. Claims 1 and 21-23 have been cancelled.

## IV. STATUS OF THE AMENDMENTS

With the filing of this Appeal all amendments have been entered and considered.

## V. SUMMARY OF THE CLAIMED SUBJECT MATTER

Independent Claim 2 is drawn to a method of attaching hydrophilic species to hydrophilic macromolecules immobilized on a hydrophobic surface by first providing a hydrophobic surface, then changing the nature of that hydrophobic surface by immobilizing hydrophilic macromolecules on the hydrophobic surface, and finally exposing the hydrophilic macromolecules immobilized on the hydrophobic surface to hydrophilic species, whereby the hydrophilic species are attached to the hydrophilic macromolecules. See, e.g., specification page 3, lines 1-8 and Claim 2. Preferred hydrophilic species that are attached to the hydrophilic macromolecules immobilized on the hydrophobic surface are nanoparticles. See specification page 3, line 9 and Claim 3.

## VI. GROUNDS OF REJECTION

### Ground (A)

Claims 2-18 and 20 are rejected as obvious, 35 U.S.C. 103, over Ford (U.S. 2002/0065242) in view of Caldwell (U.S. 5,516,703).

### Ground (B)

Claim 19 is rejected as obvious, 35 U.S.C. 103, over Ford (U.S. 2002/0065242) in view of Caldwell (U.S. 5,516,703) further in view of Berning (Nuclear Medicine & Biology, 1998).

### Ground (C)

Claims 2-6, 11, 15 and 17-19 are provisionally rejected for obviousness-type double patenting over Claims 1-5, 14 and 15 of application 10/210,812 in view of Caldwell (U.S. 5,516,703).

### Ground (D)

Claims 2-6, 11, 15 and 17-19 are provisionally rejected for obviousness-type double patenting over Claims 1-4, 14-16 and 20 of application 09/990,049 in view of Caldwell (U.S. 5,516,703).

## VII. ARGUMENT

Claim 2, the only independent claim pending herein, reads:

Claim 2: A method of attaching hydrophilic species to hydrophilic macromolecules immobilized on a hydrophobic surface, said method comprising the steps:

- (i) providing a hydrophobic surface,
- (ii) **immobilizing hydrophilic macromolecules on the hydrophobic surface,**
- (iii) **exposing the hydrophilic macromolecules immobilized on the hydrophobic surface to hydrophilic species,** whereby the hydrophilic species are attached to the hydrophilic macromolecules.

In this method hydrophilic macromolecules are immobilized **on** a hydrophobic surface. Then these immobilized hydrophilic macromolecules are exposed to hydrophilic species, such as nanoparticles, which attach to the immobilized hydrophilic macromolecules.<sup>1</sup>

The rejections of Grounds (A) - (D) all are premised on the Examiner's mistaken understanding that "Caldwell et al teach a hydrophobic substrate (col. 7, lines 19-30), in order to provide a surface with specific reactivity." See, e.g., page 3 of the Final rejection, 3-4 lines up from the bottom. This mistaken understanding leads the Examiner to conclude that it

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<sup>1</sup> While the meaning of the terms "hydrophilic" and "hydrophobic" are likely very well known to the Board, the following is from <http://www.answers.com/topic/hydrophilic> and <http://www.answers.com/topic/hydrophobic>:

### HYDROPHILIC:

Meaning #1: (chemistry) having a strong affinity for water; tending to dissolve in, mix with, or be wetted by water

Antonym: hydrophobic (meaning #1)

### HYDROPHOBIC

Meaning #1: (chemistry) lacking affinity for water; tending to repel and not absorb water; tending not to dissolve in or mix with or be wetted by water

Antonym: hydrophilic (meaning #1)

would have been obvious to “include in the method of Ford et al., a hydrophobic surface as taught by Caldwell in order to provide a surface with a high degree of reactivity and little or no background non-specific reactivity.” See the paragraph bridging pages 3-4 of the Final rejection.

Contrary to the Examiner’s understanding, Caldwell does not use a hydrophobic surface as a working surface. Caldwell specifically teaches that it is his hydrophilicly-coated substrate, and not a hydrophobic surface, that provides higher specific reactivity and little or no background non-specific reactivity:

[T]he surfaces ***provided by the coatings of the invention*** have a ***higher specific reactivity*** per unit area of surface with an even distribution of reactivity. In addition, ***there is little or no background nonspecific reactivity resulting from adsorption to unshielded surfaces.***

See col. 4, lines 22-26 of Caldwell (emphasis added). Caldwell’s coatings are made of a modified polymer surfactant, which is coated onto the surface of an underlying hydrophobic substrate:

The modified polymeric surfactant is adsorbed upon a hydrophobic polymer substrate to provide a surface with specific reactivity.

See col. 7, lines 18-20. Importantly, the result is a substrate with a hydrophilic surface:

***The surface resulting from the modified polymer adsorbed on the hydrophobic substrate is hydrophilic*** and quite compatible with

proteins that can be immobilized on the surface through the reactive sites.

Col. 4, lines 4-7 (emphasis added). Caldwell therefore teaches that before any use is made of a hydrophobic substrate, for example by attaching proteins thereto, the nature of the hydrophobic surface must first be completely changed such that a hydrophilic surface is presented. Thus, even if one were motivated to use Caldwell's substrate with the nucleic acids of Ford (or with the nucleic acids, etc. of the applications cited in the double patenting rejections) the substrate used would be the *modified* substrate of Caldwell, i.e., the *hydrophilic* surface-modified substrate of Caldwell.

These facts have been pointed out to the Examiner. The Examiner has responded, in the Advisory action (on the Continuation Sheet), that “[t]he claims do not exclude additional layers between the hydrophobic substrate and the hydrophilic macromolecules and also do not state that the hydrophilic macromolecules must be immobilized directly on the hydrophobic substrate.” Again, the Examiner is wrong.

All pending claims require “immobilizing hydrophilic macromolecules **on** the hydrophobic surface” and “exposing the hydrophilic macromolecules immobilized **on** the hydrophobic surface to hydrophilic species, whereby the hydrophilic species are attached to the hydrophilic macromolecules.” The common meaning of “on” is “in contact with.” For Example, Webster’s Collegiate Dictionary (attached) defines the word “on” as meaning “a- used as a function word to indicate position in contact with and supported by the top surface of {the book is lying \_ the table} b - used as a function word to indicate position in or in contact with an outer surface {the fly landed \_ the ceiling}...” This common meaning is consistent with the meaning of the word “on” as used in the specification of the present

invention where in Example 1 at specification pages 8-9 a SiO<sub>2</sub> substrate (hydrophilic) is coated with polystyrene (hydrophobic) prior to contact with ctDNA (hydrophilic macromolecules). In the present application and claims “immobilizing hydrophilic macromolecules **on** the hydrophobic surface” means *directly* on. Put another way, there is no difference between “on” and “directly on.”

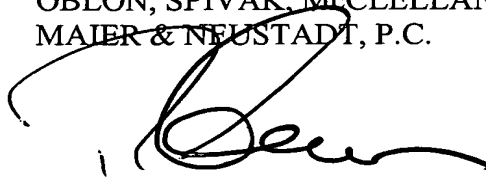
Because all of the rejections are premised on the idea that Caldwell teaches the use of a hydrophobic substrate as a platform for the immobilization of hydrophilic macromolecules, which it does not, all the rejections are unsustainable.

#### VIII. CONCLUSION

For the above reasons, it is respectfully requested that all the rejections still pending in the Final Office Action be REVERSED.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,  
MAIER & NEUSTADT, P.C.

A handwritten signature in black ink, appearing to read 'Treanor', is written over a horizontal line.

Richard L. Treanor  
Registration No. 36,379



## CLAIMS APPENDIX



Claim 1 (Cancelled).

Claim 2 (Previously Presented): A method of attaching hydrophilic species to hydrophilic macromolecules immobilized on a hydrophobic surface, said method comprising the steps:

- (i) providing a hydrophobic surface,
- (ii) immobilizing hydrophilic macromolecules on the hydrophobic surface,
- (iii) exposing the hydrophilic macromolecules immobilized on the hydrophobic surface to hydrophilic species, whereby the hydrophilic species are attached to the hydrophilic macromolecules.

Claim 3 (Previously Presented): A method according to claim 2, characterized in that the hydrophilic species comprises nanoparticles.

Claim 4 (Previously Presented): A method according to claim 2, characterized in that the hydrophilic species is in solution.

Claim 5 (Previously Presented): A method according to claim 2, comprising the additional step:

- (iv) growing the attached hydrophilic species to a larger size.

Claim 6 (Previously Presented): A method according to claim 5, characterized in that growing the attached hydrophilic species to a larger size is achieved by exposing the attached hydrophilic species to an electroless plating solution.

Claim 7 (Previously Presented): A method according to claim 2, characterized in that immobilizing the hydrophilic macromolecules on the hydrophobic surface occurs by applying the hydrophilic macromolecules to the hydrophobic surface.

Claim 8 (Previously Presented): A method according to claim 7, characterized in that applying the hydrophilic macromolecules to the hydrophobic surface occurs by a process selected from spin-coating, dip-coating, drop-casting, stamping, molecular combing, spraying-techniques, inkjet-printing and doctor-blading.

Claim 9 (Previously Presented): A method according to claim 2, characterized in that exposing the hydrophilic macromolecules to hydrophilic species, whereby the hydrophilic species are attached to the hydrophilic macromolecules, occurs over a period of time between 1 second and 120 minutes.

Claim 10 (Previously Presented): A method according to claim 9, characterized in that exposing the hydrophilic macromolecules to hydrophilic species occurs over a period of time between 10 seconds and 10 minutes.

Claim 11 (Previously Presented): A method according to claim 4, characterized in that the solution is a solution of the hydrophilic species in water or of the hydrophilic species in a water-miscible organic solvent/water mixture.

Claim 12 (Previously Presented): A method according to claim 2, characterized in that water has a contact angle on the hydrophobic surface in the range of from 30° to 110°.

Claim 13 (Previously Presented): A method according to claim 12, characterized in that water has a contact angle on the hydrophobic surface in the range of from 60° to 110°.

Claim 14 (Previously Presented): A method according to claim 2, characterized in that the hydrophilic species is selected from the group comprising water soluble metal nanoparticles,

semiconductor nanoparticles and dielectric (insulator) nanoparticles, hydrophilic clusters and metallic complexes.

Claim 15 (Previously Presented): A method according to claim 3, characterized in that the nanoparticle has a core and comprises a metal or metal oxide in the core, where the metal is selected from the group comprising Fe, Co, Ni, Cu, Ru, Rh, Pd, Os, Ir, Ag, Pt, Au or combinations, especially alloys of these metals.

Claim 16 (Previously Presented): A method according to claim 2, characterized in that the hydrophilic macromolecules are selected from the group comprising nucleic acids, proteins, dendrimers, latex spheres, polyelectrolytes, and water-soluble polymers.

Claim 17 (Previously Presented): A method according to claim 16, characterized in that the nucleic acid is selected from the group comprising DNA, RNA, PNA, CNA, oligonucleotides, oligonucleotides of RNA, A-DNA, B-DNA, Z-DNA, polynucleotides of DNA, polynucleotides of RNA, T-junctions of nucleic acids, triplexes of nucleic acid, quadruplexes of nucleic acids, domains of non-nucleic acid polymer-nucleic acid block-copolymers and combinations thereof.

Claim 18 (Previously Presented): A method according to claim 17, characterized in that the nucleic acid is double-stranded or single-stranded.

Claim 19 (Previously Presented): A method according to claim 2, characterized in that the hydrophilic species is selected from the group comprising tris(hydroxymethyl)phosphine-gold nanoparticles (THPAuNPs).

Claim 20 (Previously Presented): A method according to claim 6, characterized in that the electroless plating solution comprises a gold salt and a reducing agent.

Claim 21 (Cancelled).

Claim 22 (Cancelled).

Claim 23 (Cancelled).



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omn- *om- 'ām-ə, krän; 'öm-, Brit. ö- 'mi-krän* *n* [Gk *o mikron*, lit., small *o*] (15c): the 15th letter of the Greek alphabet — see ALPHABET table  
omni-nous 'ām-ə-nəs/ *adj* (1587): being or exhibiting an omen: PORTENTOUS; *esp*: foreboding or foreshadowing evil: INAUSPICIOUS — omni-nously *adv* — omni-nous-ness *n*  
omni-potent 'öm-ə-pə-tənt/ *adj* [L. *omnipotens*]: having a menacing or threatening aspect. OMNIPOTENS implies having a menacing, alarming character; foreshadowing evil or disaster; PORTENTOUS suggests being frighteningly big or impressive but now seldom definitely connotes foreshadowing of calamity; FATEFUL suggests being of momentous or decisive importance  
omis-sible 'öm-mis-ə-bəl/ *adj* (1816): that may be omitted  
omis-sion 'öm-mish-ən/ *s, n* [ME *omission*, fr. LL *omissio*, *omissio*, fr. L *omissus*, pp. of *omittere*] (15c): 1 *a*: apathy toward or neglect of duty *b*: something neglected or left undone *2*: the act of omitting: the state of being omitted  
omit 'öm-mit, *ä-* *v* omit-*ted*; omit-t[ing] [ME *omitten*; fr. L *omittere*, fr. *ob-* toward + *mittere* to let go, send — more at OB-SMITE] (15c): 1: to leave out or leave unmentioned *2*: to fail to perform or make use of: FORBEAR *3 obs*: DISREGARD *4 obs*: GIVE UP *syn* see NEGLECT  
om-ma-tid-i-um 'äm-ə-tid-ē-əm/ *n, pl* -tid-i-ä-*ē-ə*/ [N.L. fr. Gk *ommat-*, *omma* eye] (1884): one of the elements corresponding to a small simple eye that make up the compound eye of an arthropod — om-ma-tid-i-al 'ē-ä-l/ *adj*  
omni-comb form [L. fr. *omnis*]: all: universally (omnidirectional)  
omni-bus 'äm-ni-'(b)əs/ [F. fr. L. for all, dat. pl. of *omnis*] (1829): 1: used to designate public vehicle designed to carry a comparatively large number of passengers: BUS *2*: a book containing reprints of a number of works  
omnibus *adj* (1842): 1: of, relating to, or providing for many things at once *2*: containing or including many items  
omni-di-rection-al 'äm-ni-də-'rek-shən-l, -nəl-d-, -ni-'(d)-, -shən-'l/ *adj* (1927): being in or involving all directions; *esp*: receiving/ or sending radio waves equally well in all directions (~ antenna)  
omni-far-i-ous 'äm-nə-'far-ē-əs, -'fer-/ *adj* [LL *omnifarius*, fr. L *omni-* + *farius* (as in *multifarius* having great diversity) — more at MULTI-FARIOUS] (1653): of all varieties, forms, or kinds  
om-ni-fi-cant 'äm-ni-'fī-sənt/ *adj* [L. *omni-* + *E* *-ficent* (as in *magnificent*)] (1677): unlimited in creative power  
om-ni-po-tence 'äm-nip-ə-tən-s(ə)s/ *n* (15c): 1: the quality or state of being omnipotent *2*: an agency or force of unlimited power  
om-ni-po-tent 'ä-*n*-ə-tənt/ *adj* [ME, fr. MF, fr. L *omnipotens*, *omnipotens*, fr. *omni-* + *potens*, *potens* potent] (14c): 1: all-powerful: ALMIGHTY *2*: having virtually unlimited authority or influence *3 obs*: ARRANT — om-ni-po-tent-ly *adv*  
omnipotent *n* (1601): 1: one who is omnipotent *2 cap*: GOD *1*  
om-ni-pres-ence 'äm-ni-'prez-ən-s(ə)s/ *n* (1601): the quality or state of being omnipresent: UBQUITY  
om-ni-pres-ent 'ä-'n(ə)-əd/ (1610): present in all places at all times  
om-ni-range 'äm-ni-'ræn-/ *n* (1946): a system of radio navigation in which any bearing relative to a special radio transmitter on the ground may be chosen and flown by an airplane pilot — called also *omnidirectional range*  
om-ni-science 'äm-nish-ən-t(ə)s/ *n* [ML *omniscientia*, fr. L *omni-* + *scientia* knowledge — more at SCIENCE] (1612): the quality or state of being omniscient  
om-ni-scient 'ä-'n(ə)-əd/ *adj* [ML *omniscient*, *omnisciens*, back-formation fr. ML *omniscientia*] (1604): 1: having infinite awareness, understanding, and insight *2*: possessed of universal or complete knowledge — om-ni-scient-ly *adv*  
om-ni-gath-er-um 'äm-nē-əm-'gäth-ə-rəm/ *n, pl* omnium-gatherums [L. *omnium* (gen. pl. of *omnis*) + *E* *gather* + L. *-um*, noun ending] (1530): a miscellaneous collection (as of things or persons)  
om-ni-vore 'äm-ni-'və(ə)r-, -və(ə)r/ *n* [NL *omnivora*, neut. pl. of *omnivorus*] (1890): one that is omnivorous  
om-niv-orous 'äm-niv-(ə-)rəs/ *adj* [L. *omnivorus*, fr. *omni-* + *-vorus* -vorous] (1656): 1: feeding on both animal and vegetable substances *2*: avidly taking in everything as if devouring or consuming — om-niv-orous-ly *adv*  
on 'ön, (än) *prep* [ME *an*, on, prep. & adv., fr. OE; akin to OHG *ana* (on), Gk *ana up*, on] (bef. 12c): 1 *a* — used as a function word to indicate position in contact with and supported by the top surface of (the book is lying ~ the table) *b* — used as a function word to indicate position in or in contact with an outer surface (the fly landed ~ the ceiling) *c* — used as a function word (the fly landed ~ as a function word to indicate position in close proximity with (~ a village ~ the sea) (stay ~ your opponent) *d* — used as a function word to indicate direction or location with respect to something (~ the south) (the garden is ~ the side of the house) *2* *a* — used as a function word to indicate a source of attachment or support (~ a string) (stand ~ one foot) (hang it ~ a nail) *b* — used as a function word to indicate a source of dependence (you can rely ~ me) (feeds ~ insects) (lives ~ a pension) *c* — used as a function word to indicate means of conveyance (~ the bus) or presence within the confines or in possession of (had a knife ~ him) *3* — used as a function word to indicate a time frame during which something takes place (a parade ~ Sunday) or an instant, action, or occurrence when something begins or is done (~ cue) (~ arriving home, I found your letter) (news ~ the hour) (cash ~ delivery) *4 archaic*: OF *5* *a* — used as a function word to indicate manner of doing something; often used with the (~ the sly) (keep everything ~ up-and-up) *b* — used as a function word to indicate means or agency (cut myself ~ a knife) (talk ~ the telephone) *c* — used as a function word to indicate a medium of expression; used orig. to refer to physical position (acting ~ the stage) (best show ~ television) *6* *a* (1) — used as a function word to indicate active involvement in a condition or status (~ fire) (~ the increase) (~ the lookout) *(2)*: regularly using or showing the effects of using (~

|ə| abut |ʔ| kitten, F table |ər| further |ə| ash |ā| ace-|ä| cot, cart  
 |äʊ| out |ch| chin |e| bet |ē| easy |g| go |i| hit |ī| ice |j| job  
 |ŋ| sing |ō| go |ó| law |oi| boy |th| thin |th| the |ü| loot |ù| foot  
 |y| yet |zh| vision |ä, k, <sup>n</sup>, æ, æ, u; ū, ʔ| see Guide to Pronunciation